

# "The Southern Cross"



## HERMANUS ASTRONOMY CENTRE NEWSLETTER SEPTEMBER 2010

Welcome to this month's newsletter, which, if it seems a little different this month, is being compiled by yours truly (Steve) while Jenny is away on her travels. I trust that it will keep up the high standard set by Jenny. I also apologise that there are no interesting articles attached this month. Time and space constraints.

### Interest Group Meetings coming up:

#### 1. BEGINNERS.

To accommodate public holidays and the festive season, the dates for the new format Beginners Astronomy meetings have been amended. The dates for the remainder of 2010 are, as follows:

- Part 1 Mon 13 September - 'The Solar System',
- Part 2 Mon 11 October - 'The Life & Death of Stars', and
- Part 3 Mon 8 November - 'Milky Way, other galaxies & the universe'.

The meetings will take place from 7.00 pm at the Hermanus Magnetic Observatory. As usual, after the evening's presentation, weather and time permitting, there will be live observing with the Centre's telescope.

Entry for Centre members is free, and for non-members, the entrance fee will be R20, or R50 for all three evenings. If you wish to come along, it is essential to contact John Saunders - 028 314 0543 or e-mail

[shearwater@hermanus.co.za](mailto:shearwater@hermanus.co.za) by the Friday before each meeting as space is limited.

2. COSMOLOGY The general Cosmology group meetings will continue on the 1st and 3rd Monday of each month.

On 2 August, 12 members discussed Leonard Susskind's alternative theory to the apparent loss of information associated with Hawking's hypothesis on the

nature of black holes. At the meeting on 16 August, eleven members considered how characteristics of quantum mechanics, particularly the notion of 'entanglement', has parallels to what is known about consciousness and the nature of human perception and experience.

Pierre Hugo, convener of the Cosmology Group, has donated a set of professional DVD recordings of lectures on Cosmology to the Centre. The introduction will be presented on Monday 1st November followed by further sets of two lectures on each day on the first Monday of each month. Non-members will be able to attend their first lecture free of charge but thereafter they will be expected to join the HAC and pay a full membership fee. This promises to be a fascinating and very exciting innovation for the Centre. As soon as final arrangements are complete full details will be published.

### AUGUST's CENTRE MEETING

Greg Roberts, retired Astronomer and satellite observer, gave a very interesting presentation about the world of so-called 'space detectives', the small, dedicated international group, who track satellites and other space objects.

He outlined the optical and radio equipment and techniques used to identify and track the tens of thousands of objects orbiting Earth, and the software available to undertake necessary calculations. He focused, particularly, on the work done by a small number of people, including himself, on finding and tracking so-called classified satellites (much to the consternation of the relevant authorities), and publishing their observations on the Web.

### EDUCATION OUTREACH

On 17th Sept. John Saunders gave a presentation for the Hermanus Hospice which was enthusiastically received and a follow up has been requested. John plans another for the Quest ladies on the 28th at Mollegren.

The exciting development of going online with the Monet North (at Macdonald Observatory in Texas) and South (at Sutherland) telescopes for educational observations in partnership with schools etc has taken another step forward. A "dummy" run is possible on Sunday 26th led live online by Dr. Rick Hessman from Germany.

### MONTHLY CENTRE EVENINGS 2010

These take place at 7 pm at the **Hermanus Magnetic Observatory**.

- 9 September 'SALT: construction and eye surgery' by Case Rijdsdijk, scientist and astronomer
- 7 October 'Comets: the trailblazers' by John Saunders (chairman)
- 11 November Presenter: Amanda Gulbis, Astronomer, SAAO, Cape Town  
Topic to be confirmed
- 9 December Christmas party

### ADVANCE DATES OF MONTHLY CENTRE MEETINGS FOR 2011

Provisional dates for meetings in 2011 are: 13 January, 3 February, 10 March, 7 April, 5 May, 2 June, 7 July, 4 August, 1 September, 6 October, 3 November, and 8 December (Christmas party). Details of topics and presenters will be circulated once they have been confirmed. The meetings will continue to take place at 7 pm at the Hermanus Magnetic Observatory.

### OBSERVATORY NEWS

Sufficient funding has now been secured and as soon as it is in the HAC bank account, the 2nd phase of the Environment Impact Assessment for this project can be completed. At least three alternative sites are under consideration. However until everything is formally confirmed the location must remain undisclosed. As soon as it is possible an announcement will be made.

#### What's up:

A very bright Venus has been visible to the north-west as the bright 'evening star' for several months, setting increasingly later every day. It will be particularly interesting to observe on 13 September and for some days later, as it will be in conjunction with Mars. Venus will only be visible in the evenings until early October, after which it becomes the 'morning star' from November. And don't forget Johan Retief's Sky for the Month for Sept. where Jupiter is highlighted and will be special for Planetary enthusiasts.

### ASTRONOMY NEWS

#### 1. Star speedster.

NASA'S Hubble Shows Hyperfast Star Was Booted From Milky Way  
WASHINGTON -- NASA's Hubble Space Telescope has detected a

hypervelocity star, a rare phenomenon moving three times faster than our sun.

The star may have been created in a cosmic misstep. A hundred million years ago, a triple-star system was travelling through the bustling centre of our Milky Way galaxy when it wandered too close to the galaxy's giant black hole. The black hole captured one of the stars and hurled the other two out of the Milky Way. The two outbound stars merged to form a super-hot blue star travelling at incredible speeds.

This story may seem like science fiction, but Hubble astronomers say it is the most likely scenario for the creation of a so-called hypervelocity star, known as HE 0437-5439. It is one of the fastest ever detected with a speed of 1.6 million mph. Hubble observations confirm that the stellar speedster hails from the Milky Way's core, settling some confusion about the star's original home.

The stellar outcast already is cruising in the Milky Way's distant outskirts about 200,000 light-years from the galaxy's centre. Using Hubble to measure the runaway star's direction and determine the Milky Way's core as its starting point, Brown and Gnedin's team calculated how fast the star had to have been ejected to reach its current location.

The most likely explanation for the star's blue colour and extreme speed is that it was part of a triple-star system that was involved in a gravitational billiards game with the galaxy's monster black hole. This concept for imparting an escape velocity on stars was first proposed in 1988. The theory predicted the Milky Way's black hole should eject a star about once every 100,000 years.

The triple-star system contained a pair of closely orbiting stars and a third outer member also gravitationally tied to the group. The black hole pulled the outer star away from the tight binary system. The doomed star's momentum was transferred to the stellar twosome, boosting the duo to escape velocity from the galaxy. As the pair rocketed away, they went on with normal stellar evolution.

The more massive companion evolved more quickly, puffing up to become a red giant. It enveloped its partner, and the two stars spiralled together, merging into one superstar, the blue straggler that Hubble observed. A blue straggler

is a relatively young, massive star produced by the merger of two lighter-weight stars.

## 2. Jupiter in trouble again.

Jupiter attacked for third time in 13 months  
00:13 24 August 2010 by David Shiga (New Scientist)

For the third time in just over a year, amateur astronomers have detected a comet or asteroid strike on Jupiter. The observations, made possible by the widespread use of astronomical video recordings, show that impacts on the giant planet occur more frequently than previously thought.

On Friday, a small comet or asteroid slammed into Jupiter's atmosphere, producing a brief fireball that was independently recorded by two Japanese amateur astronomers taking video through their telescopes.

The observation comes hot on the heels of two similar observations by amateur astronomers in the last 13 months - one in June 2010 and the other in July 2009, though in the latter case only a dark bruise left by the impact was observed.

Prior to the three recent observations, only one definite case of a comet or asteroid hitting Jupiter was known - the collision of fragments of comet Shoemaker-Levy 9 in 1994, an event that was predicted in advance and widely observed with professional telescopes. In 1690, however, the Italian astronomer Giovanni Domenico Cassini, who discovered four of Saturn's moons, made drawings of an event that looked suspiciously like an impact.

At the time of the 1994 comet strike, astronomers thought that impacts on Jupiter might occur only once in several centuries. But the recent amateur observations suggest that estimate is wrong.

Orton and a group of astronomers led by Australian amateur Anthony Wesley have suggested setting up a worldwide network of small automated telescopes to continuously monitor Jupiter for impacts.

They submitted a proposal on the idea to a committee of the US National Research Council that will set priorities for planetary science for the coming decade in a report to be released in 2011.

### 3. Asteroids split up — Announcement from the ESO.

How Asteroids Split Up — Mystery of asteroid pairs solved

26 August 2010

Asteroids are often thought of simply as big rocks orbiting the Sun, but they can have quite exciting lives. Small irregularly-shaped asteroids can be “spun up” to fast rotation rates by sunlight falling on them — much as the asymmetric profile of a propeller blade helps it to spin up in the wind. New results show that when asteroids spin fast enough, they can split into two pieces which then begin orbiting each other. Scientists call this process “rotational fission”.

A new study released this week, led by Petr Pravec of the Astronomical Institute in the Czech Republic and involving many other institutions around the world, shows that many of these binary asteroids do not remain bound to each other but escape, forming two asteroids in very similar, but independent, orbits about the Sun where previously there was just one. Many such asteroid pairs have been discovered in recent years and the new work shows that their properties match perfectly with what is expected from the rotational fission model. It was predicted that in such asteroid pairs the larger one would always be at least five times more massive than the smaller object, and this is exactly what is found. More equally-sized binary asteroids remain bound to each other.

The work is based on very precise measurements of the brightness of 35 asteroid pairs using the Danish 1.5-metre national telescope at ESO's La Silla Observatory in Chile, among other telescopes around the world.

### 4. 2 Darks = 1 Light?

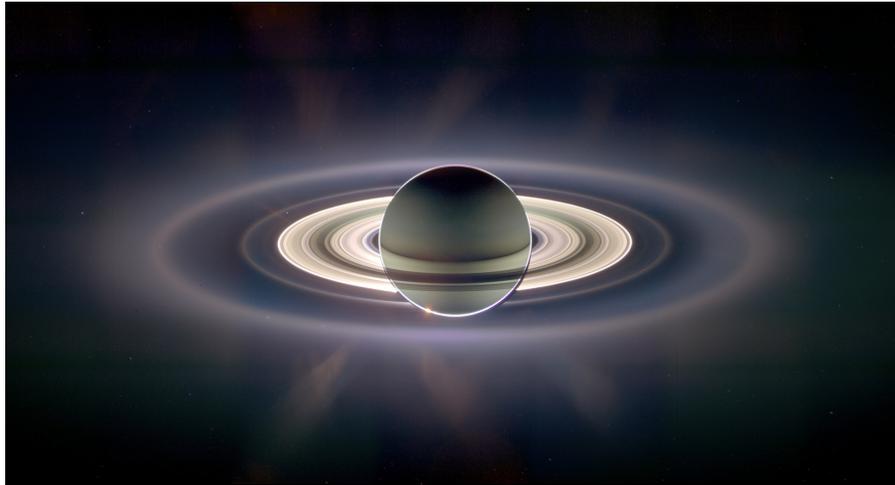
TWO of the darkest things in the universe may be making light - or at least, radiation. When jets spat out by a supermassive black hole at the centre of a galaxy collide with dark matter, they could produce gamma rays detectable from Earth - possible evidence of the elusive dark stuff.

Jets of particles are propelled away from black holes at near the speed of light. Akin to a cosmic belch, they are thought to be connected with matter falling into the black hole. Stefano Profumo of the University of California,

Santa Cruz, and his colleagues calculated how electrons in one of these jets would interact with any surrounding dark matter and emit gamma rays which can be detected from earth. (Source: New Scientist Magazine).

### DID YOU KNOW?

The second wonder of the solar system is **Saturn's** most magnificent ring



structure.

Image taken by the Cassini Spacecraft

Saturn has the most extensive planetary ring system in the solar system consisting of countless small, clumped particles, ranging from micrometres to metres in size, orbiting in a narrow plane around the planet's equator. The particles are largely water ice, with some contamination from dust and other chemicals. Although they appear to be part of a single structure, the particles all orbit Saturn independently.

Galileo was the first to observe the rings in 1610, although he was unable to observe any detail and described what appeared to be three planets adjacent to one another, one large central one with two adjacent smaller ones. In 1655, Huygens identified that the "bulges" were a ring and, in 1675, Cassini observed that the ring was, in fact, composed of a series of smaller rings.

Saturn's ring system is more like an annular disc with a few gaps than a series of rings. Individual rings have been identified and labeled. Most of the gaps between the rings are caused either by moons embedded in them or the destabilising effects of other nearby moons.

The rings extend 7,000 - 80,000 km from Saturn's equator, the average thickness being only about 10 metres. Reflection from the rings increases Saturn's apparent brightness. The rings have their own (very thin) atmosphere, separate from Saturn's. It is composed of molecular oxygen produced when ultraviolet light from the Sun interacts with the water ice of the rings.

The rings may be very old, dating to the formation of Saturn itself. Theories about their origin are either that they are the remnant of a moon which disintegrated, or they were left over from the material from which Saturn formed. The former is more likely, with collision with a large comet or asteroid, possibly around four billion years ago believed to be the cause.

**Sources** New Scientist magazine, Wikipedia, plus other Internet and printed sources

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